

# Review of Decommissioning Radioactive Waste Management and Treatment Technology for Waste Type

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## 1. Introduction

Recently, the decommissioning of nuclear power plants in Korea was decided due to the permanent suspension of Kori Unit 1.

In Korea, a large amount of disposal of exempt waste and extremely low level wastes will be generated in the process of operation and decommissioning of nuclear power plants. If the decommissioning of large capacity nuclear plants is started in the future, much larger amount of disposal of low level waste and very low level waste will be generated in a short period of time.

Therefore, the disposal strategy for the decommissioning radioactive waste should be prepared first, and appropriate measures for disposal of these wastes should be followed accordingly.

In this paper, the current status of domestic and overseas radioactive waste classification standard and disposal technology for radioactive waste generated by the decommissioning was summarized and reviewed.[1],[2],[3],[4]

## 2. Disposal Waste Characteristics

The decommissioning radioactive waste is defined as the waste of a nuclear facility that has been discarded. These waste can be generated by various activities (e.g. decontamination and demolition) to make the radioactivity level of nuclear site to acceptable level.

The characteristics of the decommissioning radioactive waste are as follows.

- Larger amount than operational wastes in a

shorter period

- Have various forms
- Have low or very low radioactivity

In addition, they consist of metal and concrete because most of them are construction wastes.[5]

## 3. Classification Standard for Domestic and Overseas Radioactive Waste

Spent nuclear fuel waste should be disposed of in-depth, intermediate level waste shall be disposed of rock cavern & deep geological site, low-level and very low-level wastes shall be disposed of surface disposal site. Exempt wastes are allowed to be reclaimed or recycled in accordance with other laws and regulations.[1],[2]

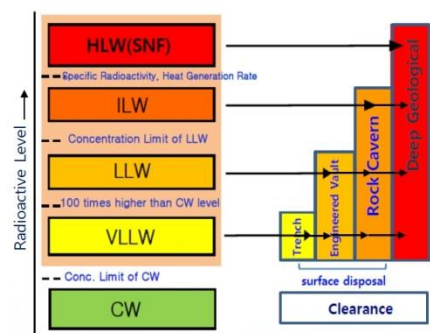


Fig. 1. Classification and Disposal of Waste in Korea.

The International Atomic Energy Agency(IAEA) has classified radioactive wastes into six categories, depending on the half-life and radioactivity content: High Level Waste(HLW), Intermediate Level Waste(ILW), Low Level Waste(LLW), Very Low Level Waste(VLLW), Very Short-Lived Waste(VSLW) and Exempt Waste(EW) as described

in Fig. 2. [3],[4]

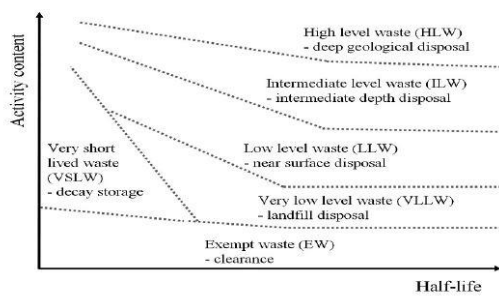


Fig. 2. Conceptual illustration of waste classification scheme.

#### 4. Treatment Technology for Waste Disposal

In the decommissioning process of nuclear power plants decommissioning radioactive waste is mostly metal waste and concrete waste used as building construction materials.[5]

##### 4.1 Metal Waste

Wastes when the decommissioning nuclear power plants are generated in various form such as metal pieces, concrete, and in large amounts. Some countries have acquired the techniques to minimize radioactive metal waste through long-term R&D and experiences based on recycling scenarios of waste, behavior of radionuclides, and so on. Actually, commercial treatment facility is in operation, and many R&D projects for more safe and economical recycling in the nuclear industry are continuing.

##### 4.2 Concrete Waste

Contaminated radioactive concrete waste is the waste which is generated by the decommissioning nuclear power plants. In European Commission report, it is expected that there will be 5 million tons of concrete waste from the decommissioning nuclear power plants in Europe by 2060. Some countries such as USA, Germany had recognized the importance of recycling concrete waste and had used it as a solid form for shielding block in some cases.

#### 5. Conclusions

The decommissioning and maintenance of nuclear power plants generate a large amount of waste, and the waste disposal site is not enough to accommodate the waste, and the disposal cost is continuously increasing. Therefore, the reduction and recycling of dismantled waste is essential in terms of environmental and economic aspects. Considering the fact that the disposal cost of radioactive waste is not easily secured and the disposal cost of radioactive waste is continuously increasing, it is one of the waste management measures to reduce the volume of bulk dismantled waste generated during dismantling of nuclear power plants or dispose of exempt waste. It is considered. The recycling of dismantled wastes that will occur when dismantling nuclear power plants in the future is an important issue for us in terms of environmental aspects and economics.

Therefore, it is necessary to study waste disposal technologies that will be developed in the future.

#### REFERENCES

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